



MILITARY TRAFFIC MANAGEMENT COMMAND TRANSPORTATION ENGINEERING AGENCY



MTMCTEA - Turning Today's Visions Into Tomorrow's Strength





**MILITARY TRAFFIC MANAGEMENT COMMAND
TRANSPORTATION ENGINEERING AGENCY**



Improving Force Deployment

Unclassified

MTMCTEA: DoD's Premier Deployment Engineering and Analysis Center



R. Bryan Reynolds
Chief, Deployability Engineering
14 Aug 03

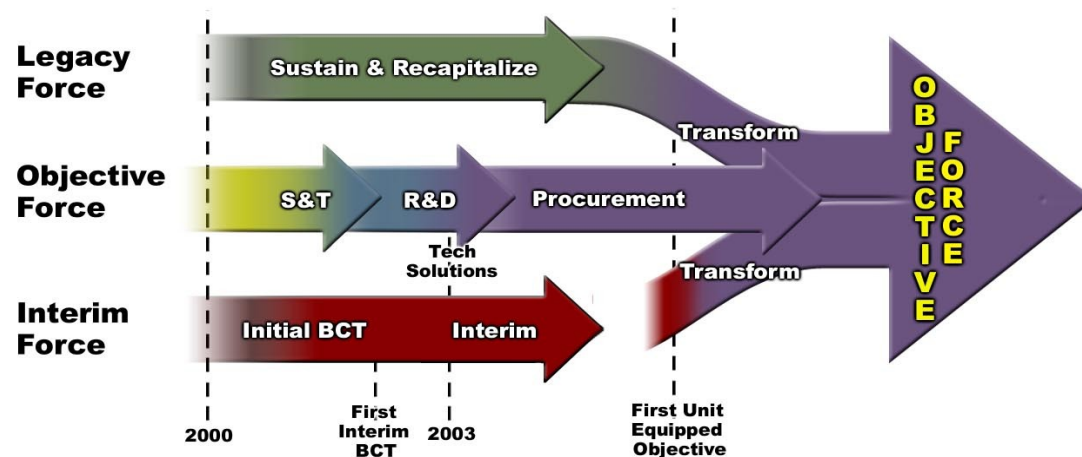




The Challenge



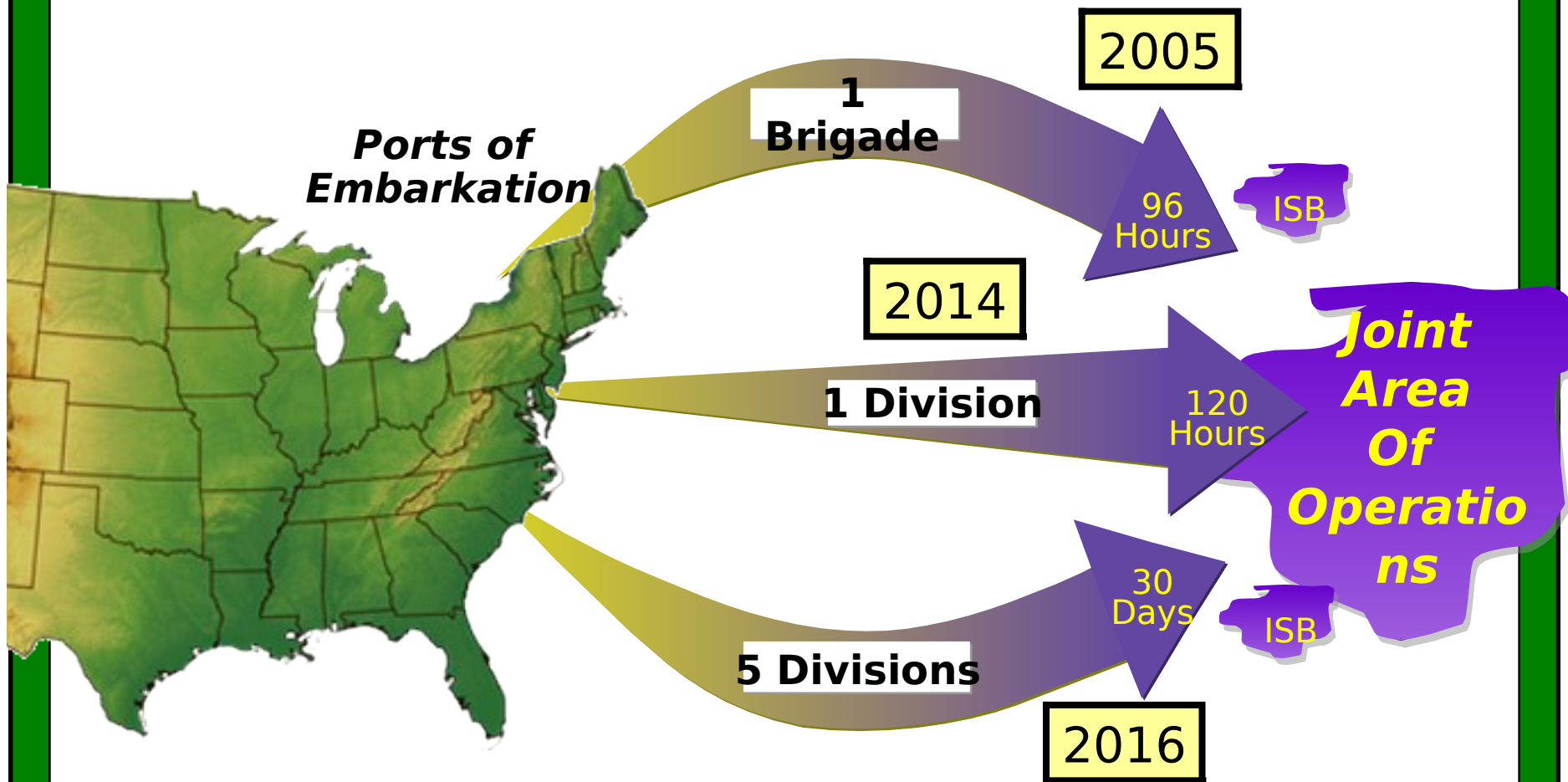
The Army Transformation



*... Responsive, Deployable, Agile, Versatile,
Lethal, Survivable, Sustainable.*



Deployment Goals





Involvement in Army Transformation

Army Transformation Campaign Plan

- CDR, MTMC must “ensure the transportability and deployability of the Interim and Objective Forces”

TRADOC
AMC
HQDA
DA G4

DA G3
DA G8
ATEC

DOD Engineering for Transportability, AR 70-44

Infrastructure Analysis Support to HQDA



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Organization and Functions

Deployability
Engineering
Expertise

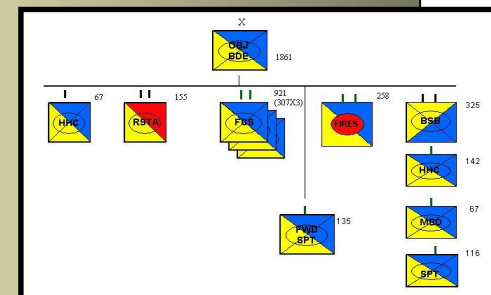
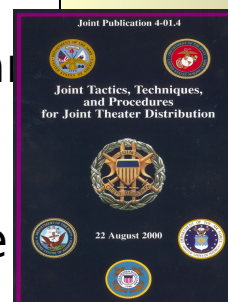
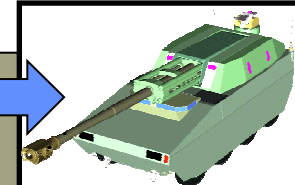
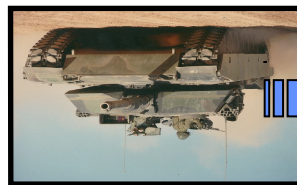
Improving
global
deployability
of our forces





Deployability Engineering: Improving the Process

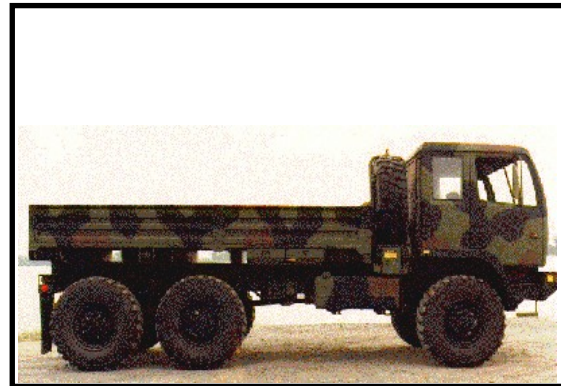
- Equipment Transportability
- DTS Assets
- Infrastructure
- Force Structure and Deployment Plans
- Policy, Programmatics, and Doctrine
- Operations and Exercises



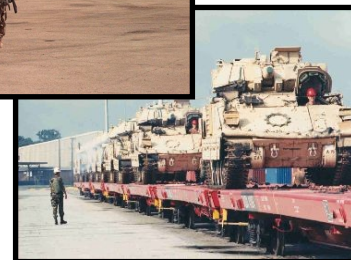


Transportability and Deployability

Transportability is the inherent capability of an item of equipment to be efficiently moved by required transportation assets and/or modes.



Deployability is the capability of the force (personnel and materiel) to be moved intraCONUS, intertheater, and





Why Equipment Transportability?





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Army Transportability Program



ASA (ALT), Provides Policy Guidance



Army G-4, General Staff Guidance



CDR MTMC, Designated by ASA as Army Transportability Agent



Dir TEA, Transportability Criteria, Approvals, Day-to-Day Ops

**OSDL (TP)
TRANSCOM**



Applicable Regulations

AR 70-1, System Acquisition Policy

AR 70-44, DOD Engineering for Transportability

AR 70-47, Engineering for Transportability

AR 71-9, Materiel Requirements

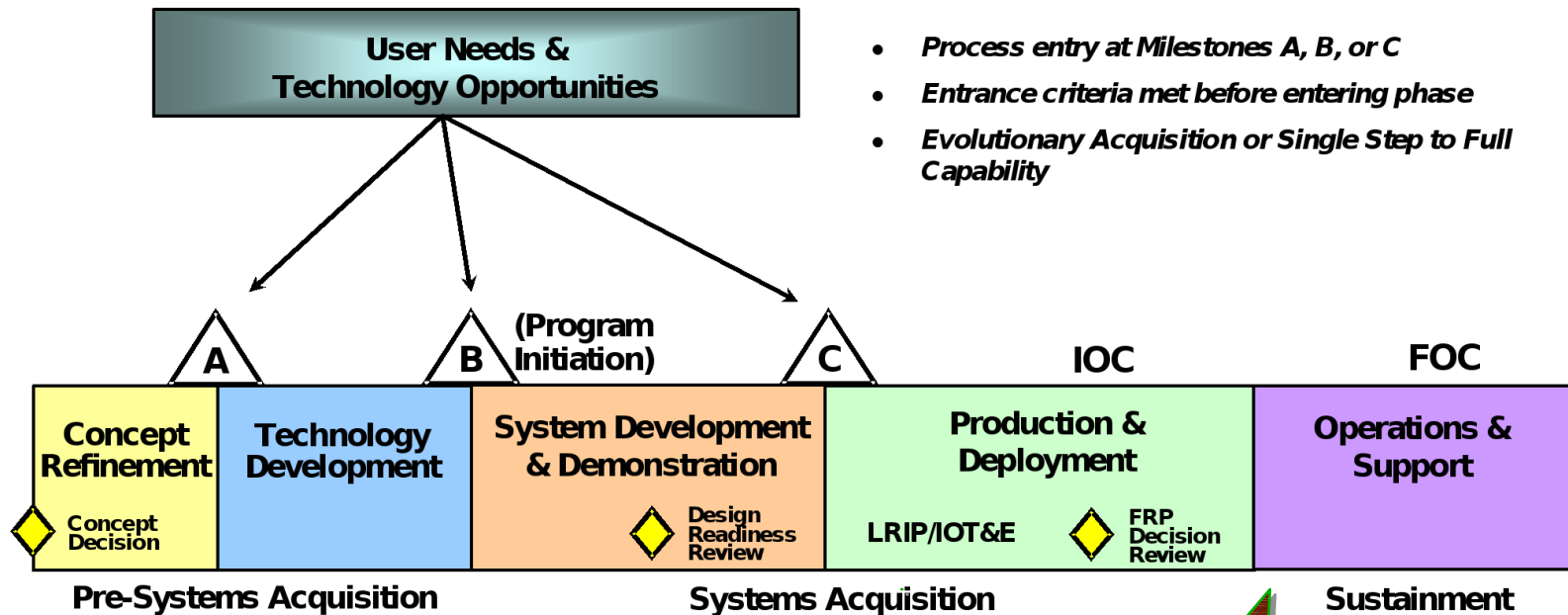
AR 700-134, Materiel Release

AR 700-142, Integrated Logistic Support

New 5000 Regs
New DODI 4540.bb



Acquisition Process

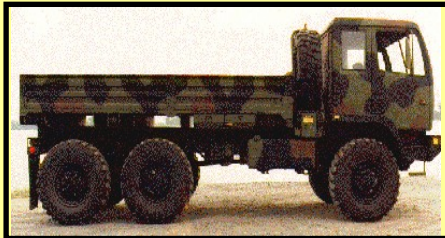


**Streamlined
Process!**



Transportability Problem Item

Wheeled
or
Tracked



Exceeds any of
these dimensions:

8 feet high
8 feet wide
20 feet long

or



or

Exceeds any
of these
weights
or pressures:

5,000 lb axle load
2,500 lb wheel load
90 PSI tire pressure
10,000 lbs.
50 PSI
1,600 PLF





Transportability Approval Process

- Provide input into MNS and CNS (now ICD).
- Help define transportability requirements for ORD (now CPD).
- Help translate CPD reqts into PD/Specification.
- Participate in Source Selection Evaluation Boards.
- Review Transportability Report.
- Analyze system characteristics to ensure CPD requirements are met.
- Provide transportability and deployability assessments for CBTDEV and MATDEV prior to MS B.
- Provide guidance and participate in transportability testing.
- Provide transportability approval, or provide corrective actions needed to obtain approval, prior to MS C.
- Transportability approval is given and concurrence with materiel release provided when the system meets its requirements.

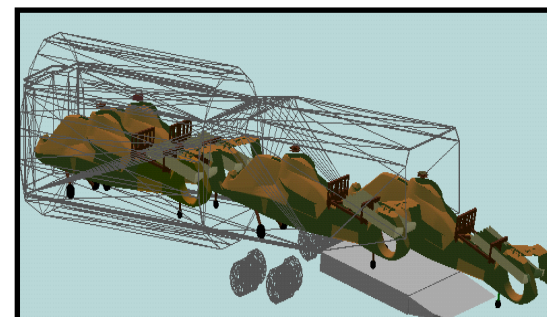
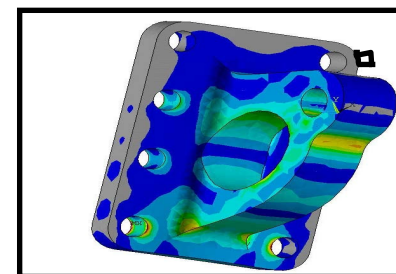
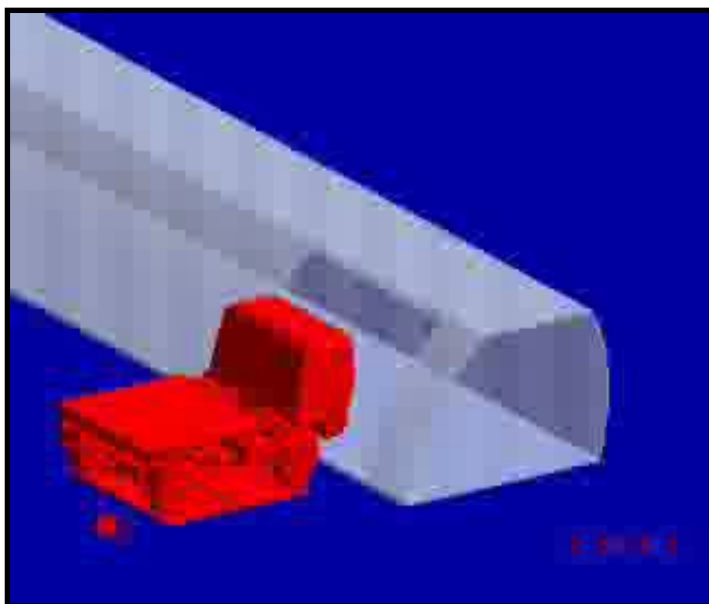
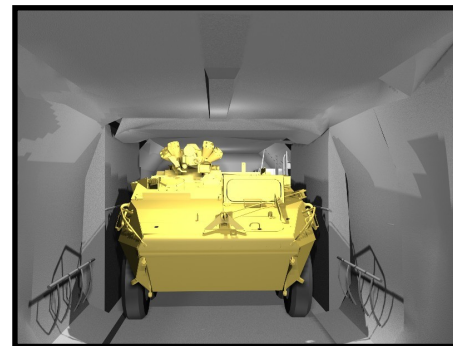
Assistance
during
every step!





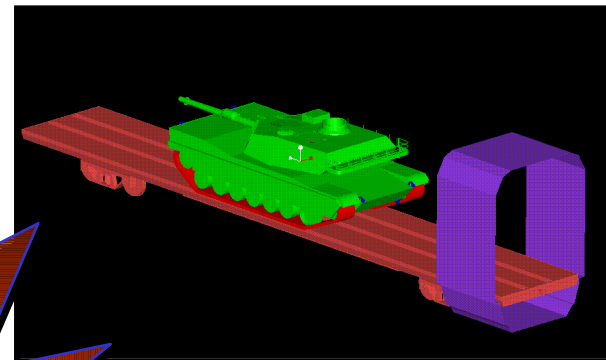
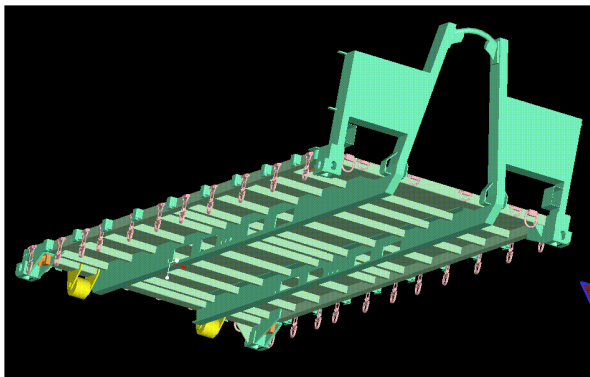
Transportability Modeling and Simulation

- 3D Modeling (ProEngineer)
- Finite Element Analysis
- Dynamic/Kinematic Analyses (DADS/ADAMS)

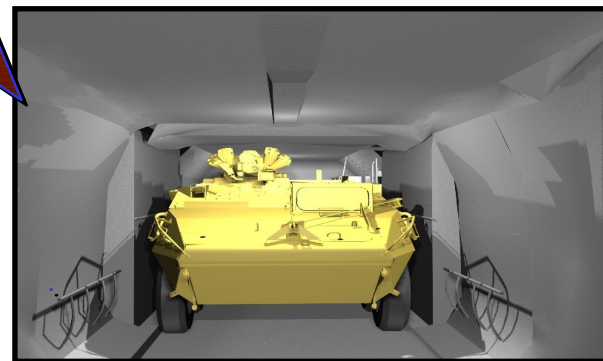
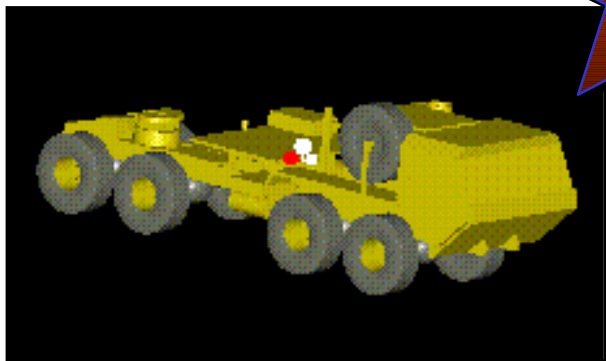




3-D Modeling

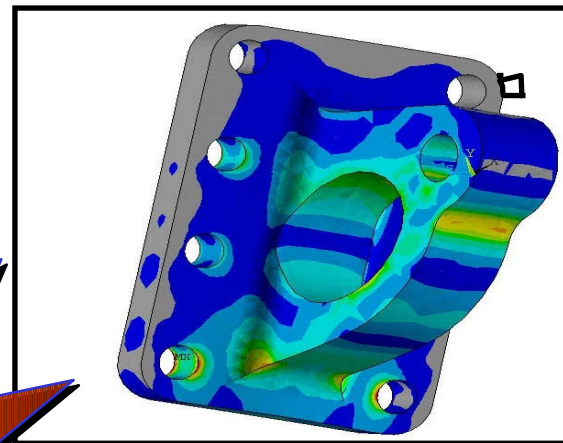
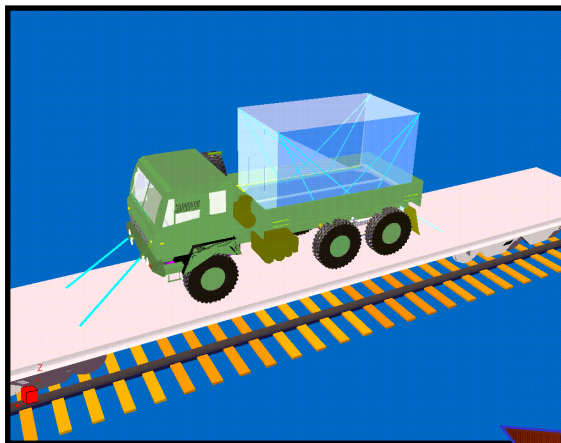


**Determine
Form
and Fit**

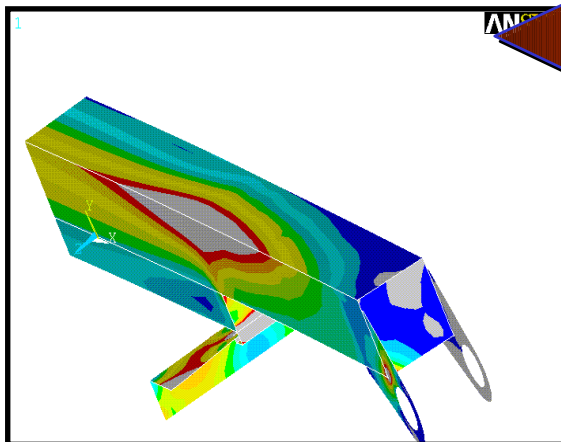




Structural Analysis



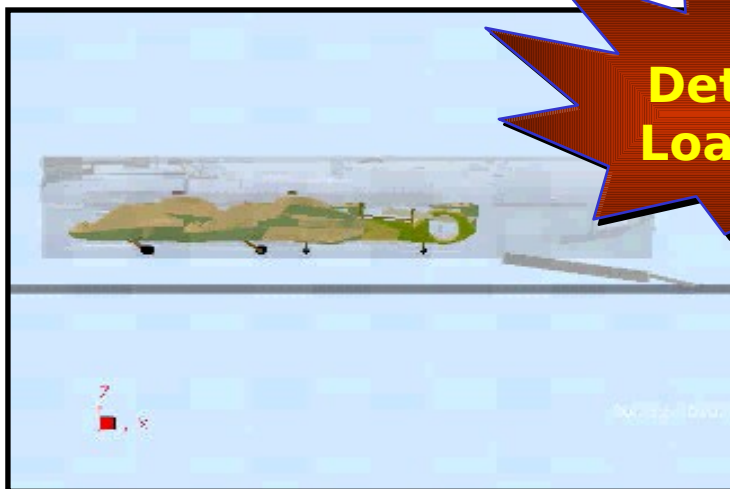
**Determine
Structural
Integrity**



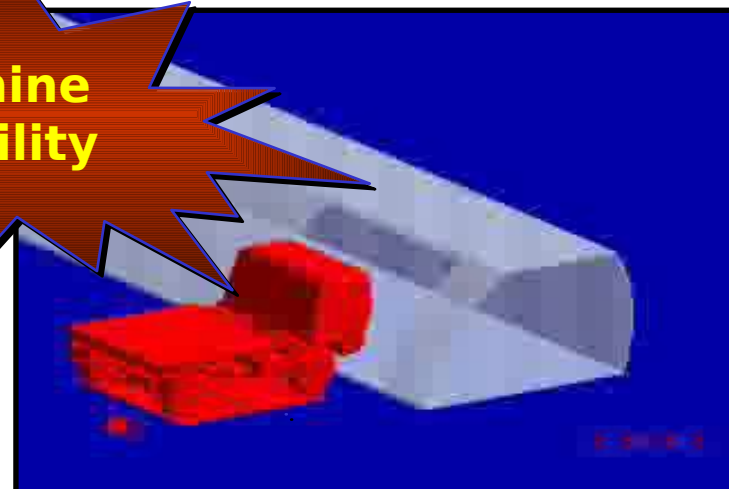


Dynamic/Kinematic

- Assigns properties of motion to 3-D models
- Virtual loadings
 - Comanche loading into a C-130 & C-17
 - Military vehicle loading into a commercial cargo aircraft



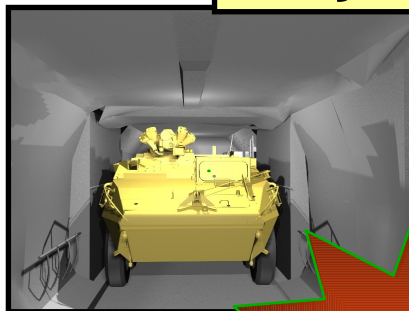
**Determine
Loadability**



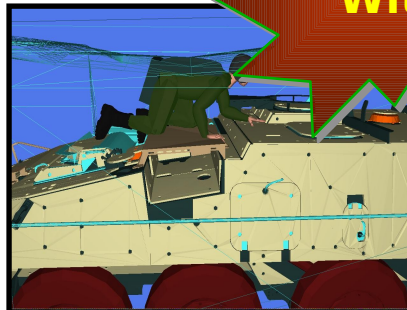


Stryker Acquisition Support

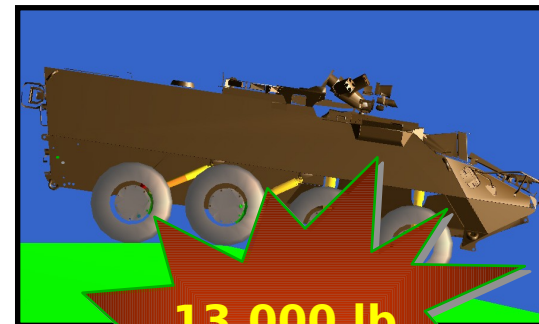
Demo
loading
Jan 02



**Liaison
With AF**



Ramp Demo
May 02



**13,000 lb
axle limit**





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Length 480 inches including
length of the tie downs

On a few C-130 aircraft, the
latrine encroaches 20 inches into
the 480-inch length,
further reducing
the usable
length.

Width: **96 inches** to 5.5 inches off the
floor (including tire bulge)
Width: **99 inches** above 5.5 inches off
the floor to accommodate crew safety
aisle (Combat capable upon arrival -
crew must accompany the vehicle)

Height 102 inches including
height of any shoring
needed

Independent suspension
may affect axle loading

Tire pressure less
than
equal to 100 psi

Axle load NTE 13,000 lbs,
especially when cresting the
loading ramp.
Concentrated floor load NTE 50
lbs/sq in

Vehicle Weight = **COMBAT CAPABLE** w/ crew
and their gear, ammo basic load, $\frac{3}{4}$ tank of
fuel, spares, sustainment for 3 day high
intensity or a portion of sustainment for a 7
day moderate intensity mission

Weight (to meet 1,000 nm range, same as
IBCT)

**IDEAL CONDITIONS - Actual results
may vary**

	W/ fuel 250 nm dist
W/fuel 100 dist	
Vehicle	14.5
	16.0
C-130 Armor Kit	-.8
(if required)	
Max vehicle weight	13.7
	15.2

**NOTE : Vehicle weight should consider the "weight
growth" phenomenon (P3I, etc.), which affects all systems
- historically, by almost 25%**

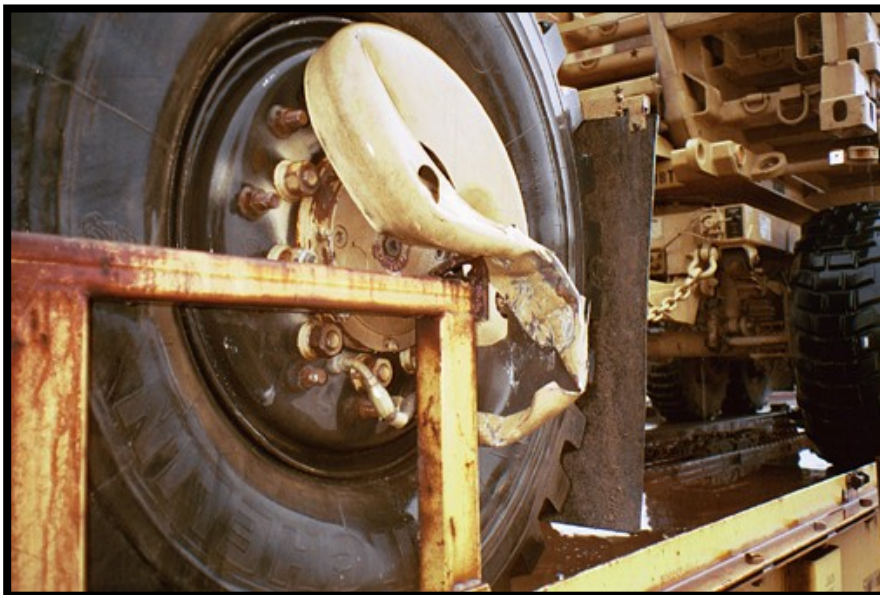


Deployability Engineering: Improving the Process

- Equipment Transportability
- DTS Assets
- Infrastructure...the DTS
- Force Structure and Deployment Plans
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- Operations and Exercises



Why DTS Assets?





Maximizing DTS Asset Utility



Concept
Development

Fabrication

Recapitalization



Potential Future DTS Assets

- Super-short Take Off and Landing Aircraft



- ~30-40 tons
- Austere airfields

- Future Transport Rotorcraft



- ~20 tons
- Vertical Insertion

- Ultra Large Airlifters



- ~120 knots
- ~1000 tons

Air Maneuver Transport



Potential Future DTS Assets

- High Speed Catamarans



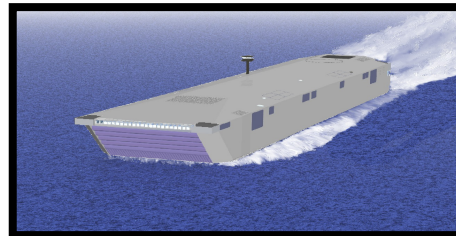
- ~45 knots
- 650 tons
- Shallow draft

- Light Aerial Multi-purpose Vehicle



- VTOL
- 740 lb payload
- 90 mile range
- 350 MPH

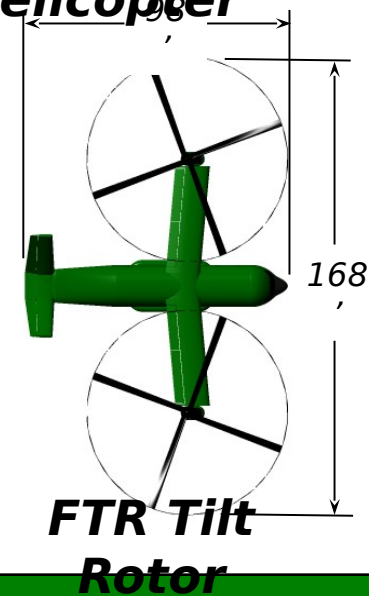
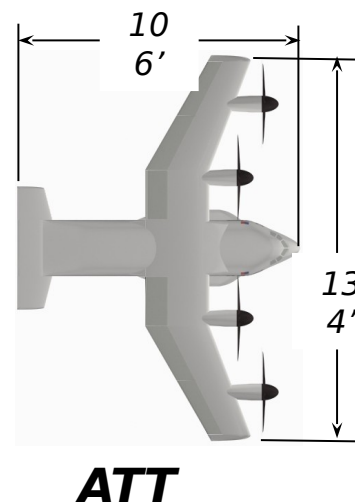
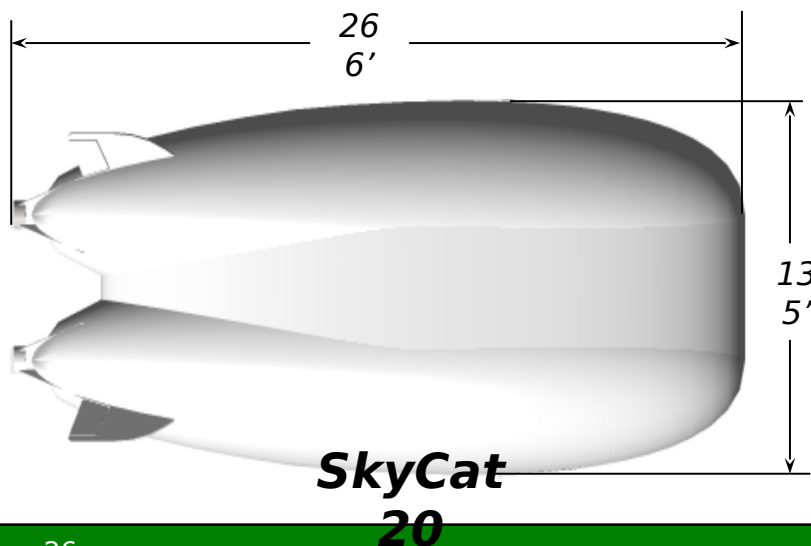
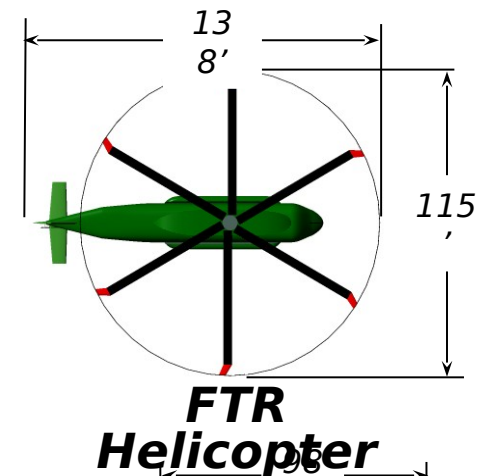
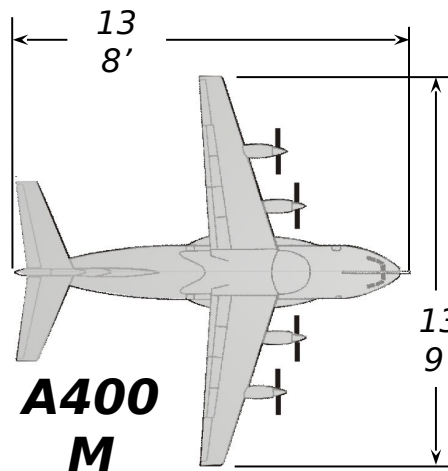
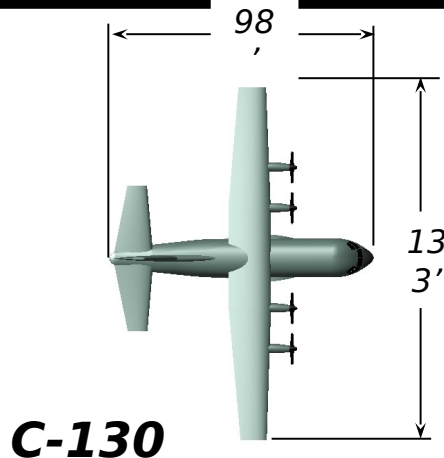
- Surface Effects Vessels



- ~65-100 knots
- ~5000 tons
- Austere Port



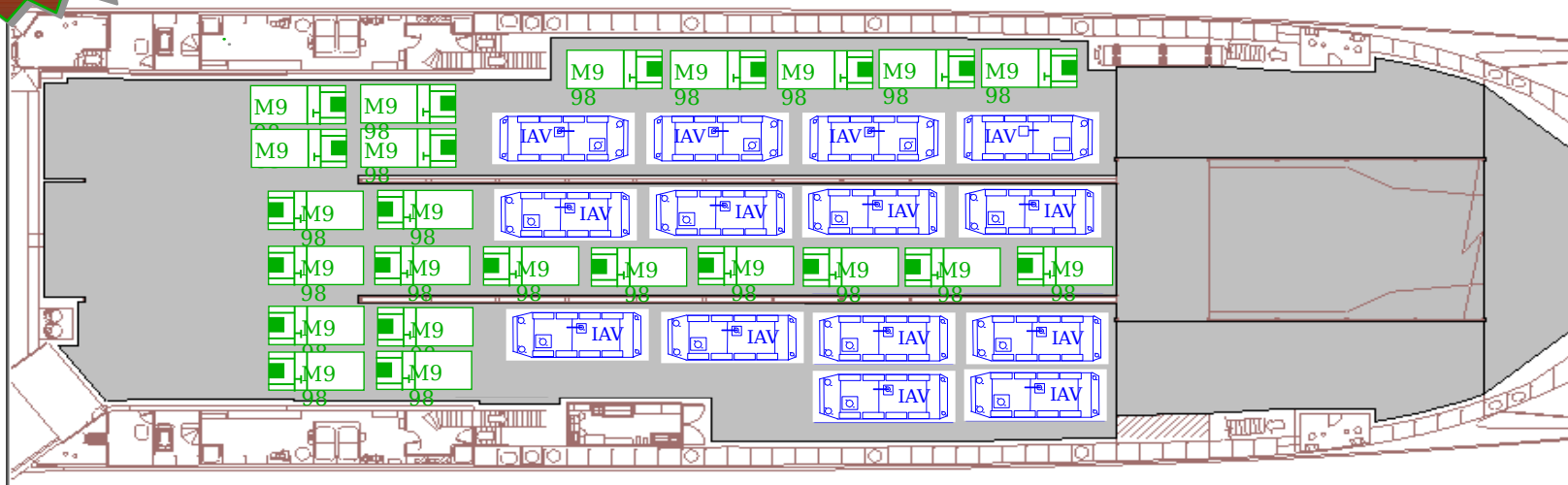
Potential Future DTS Assets





Analyzing/Designing Future Assets

ICODES



Model Number	Description	Quantity	Length inches	Width inches	Height inches	Weight pounds	L/T long tons	Area sq. feet
M998	TRK UTIL CRG/TRP CARR	23	187	84	53	5280	2.36	109
Stryker	Infantry Combat Vehicle	14	284	110	109	38000	16.96	21
		37 grand tot.					653440 grand tot.	291.71 grand tot.

TSV
also!



White Papers

C-130E/H/J/J-30 Transportability of Army Vehicles

- Initiated at request of DA G4
- Apr 01 – Present
- At AMC for working level review



C-17 Transportability of Army Vehicles

- Initiated at request of TRANSCOM J-5 and DA G4
- Apr 01 – May 02
- Approved by AMC and DCINC TRANSCOM





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Why Infrastructure?

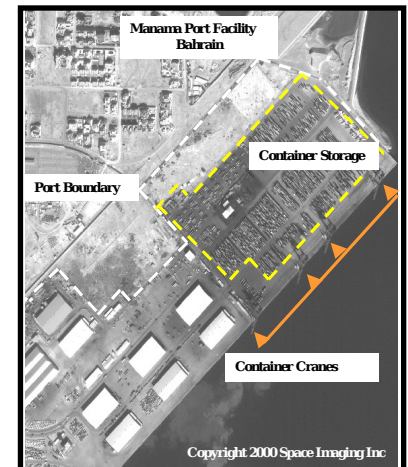




Infrastructure Improvements

Robust Infrastructure Supports Rapid Deployment

- Evaluate throughput
 - Networks
 - Installations
 - Airports
 - Seaports
 - Future sites for IBCTs
- Advise Army on where to allocate funding
- Use GIS Software, models, and imagery

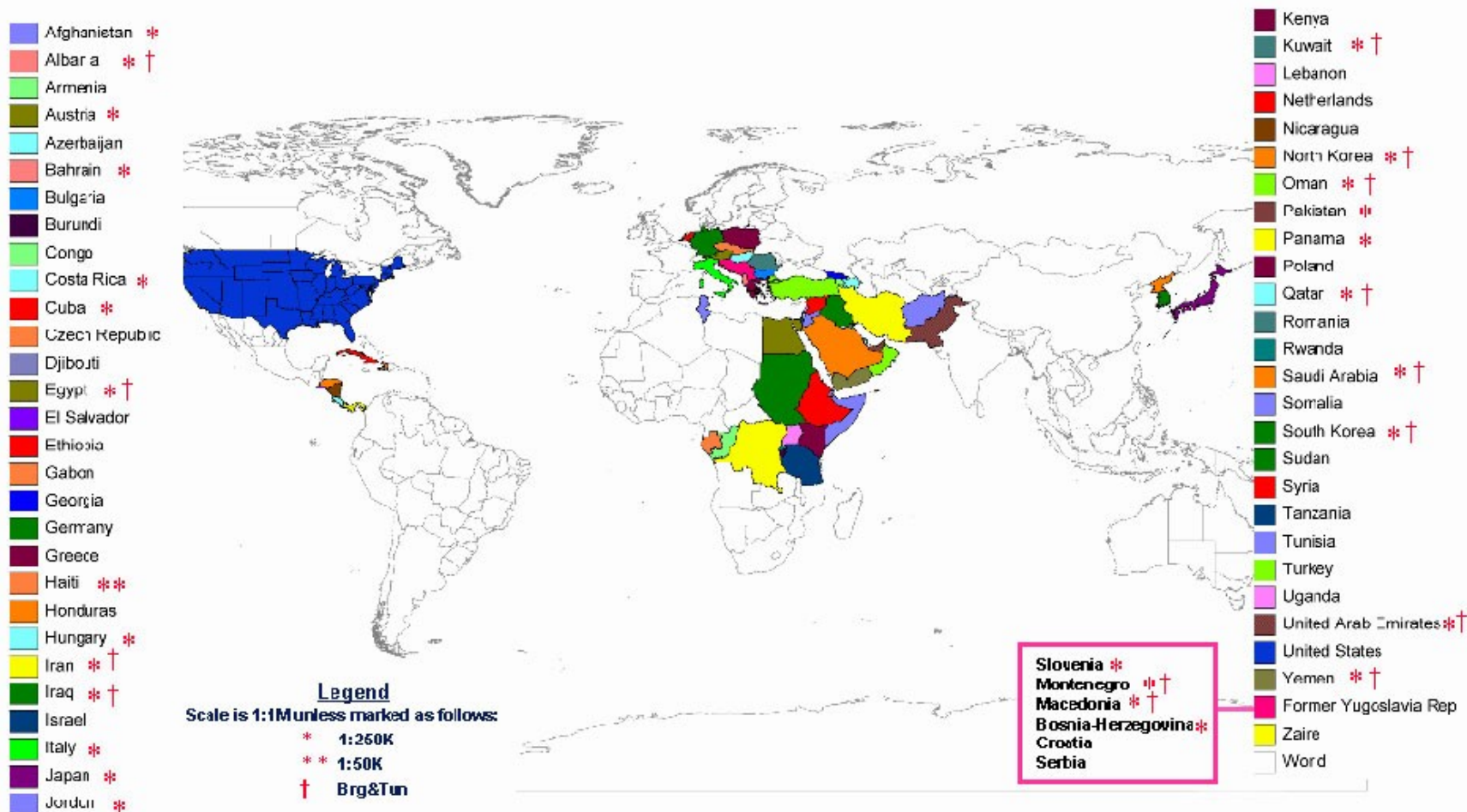




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Networks



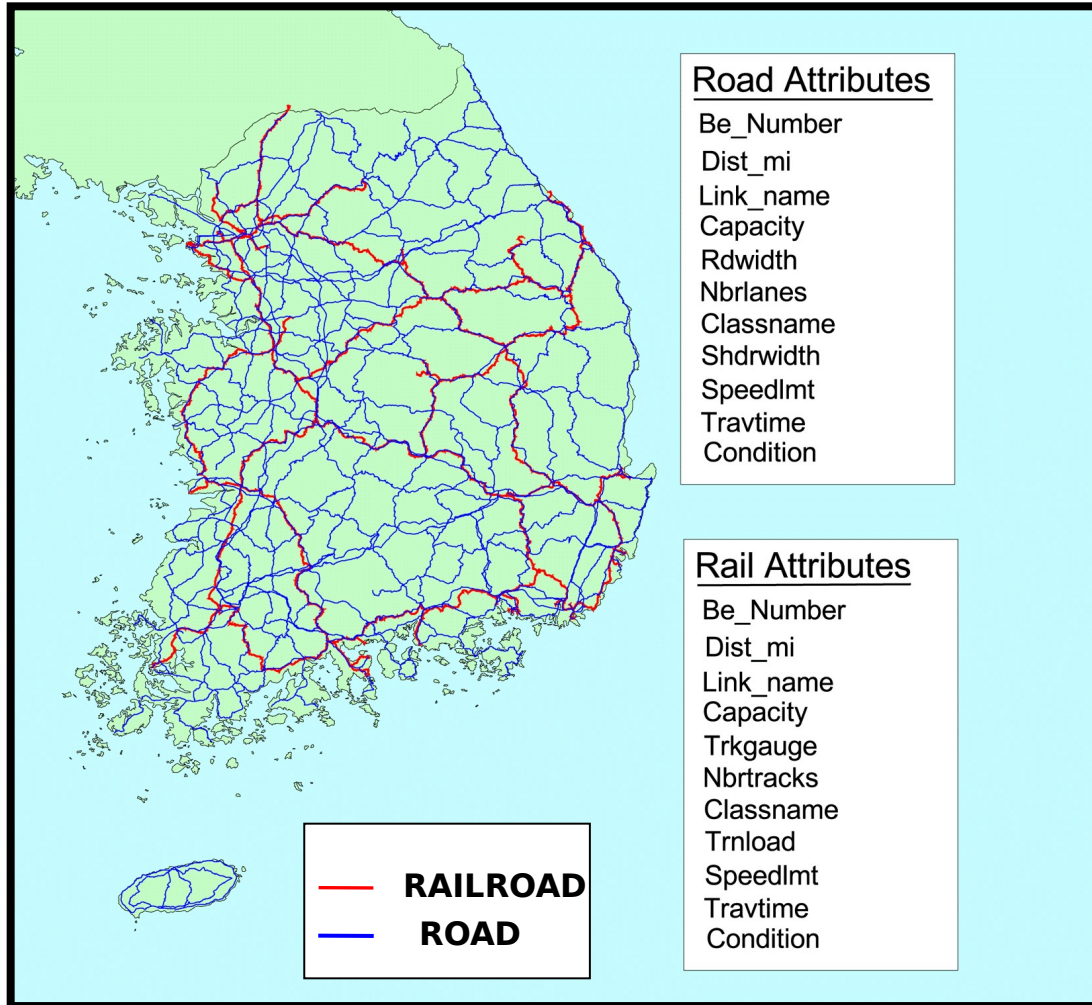


Detailed Networks/Data

Network

Throughput

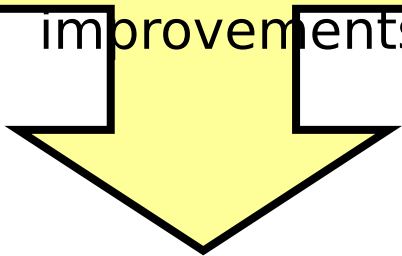
- Bridge Capability
- Port Capacity
- Harbor Depths
- Port Container Throughput
- Airport Capability
- Runway Lengths





Infrastructure

On-site surveys
Maintain data
Publish Studies
Realistic Analyses
Recommend
improvements



MOTCO, MOTSU, Indian Island
USAEUR Study, Aviano Study,
Sierra AD, PNDs

What's assumed.



What's there!





Critical Infrastructure Protection

- Improve DOD's power projection capability
- Manage HND, RND, & PND Programs
- Assimilate DOD requirements into Civil Sector programs
- Traditional DOD/DOT interface
- Ensure disruptions to civil sector infrastructure will not prevent military deployment

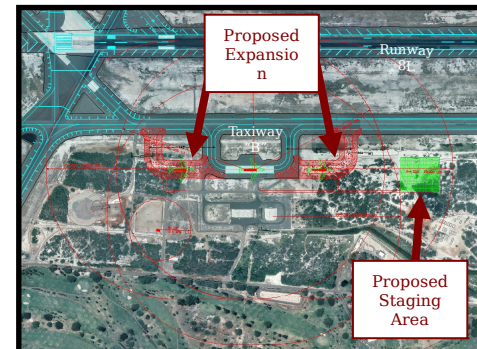




SBCT Location Analysis

Identified deficiencies and recommended improvements

- Lewis/McChord
- Polk/Alexandria
- Drum/Wheeler-Sack
- Schofield/Hickam
- Richardson/Elmendorf
- Wainwright/Eielson



Hot Cargo Pads



Pallet Processing
Facilities

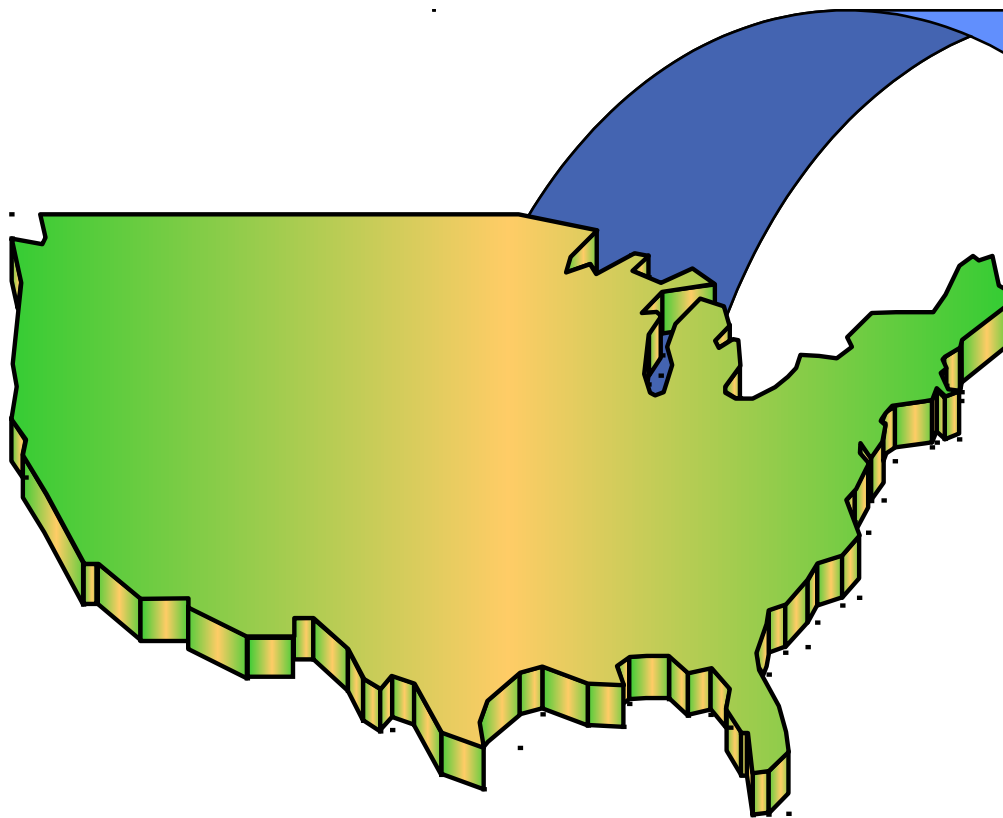


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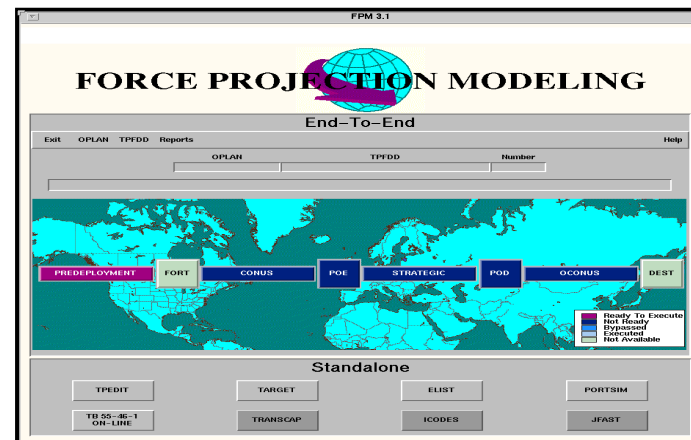
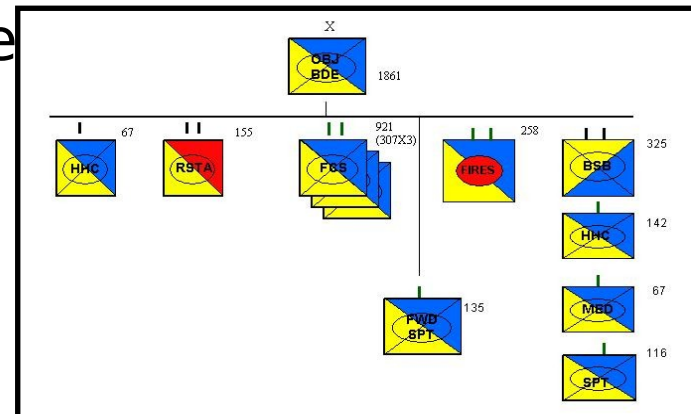
Why Structure and Plans?





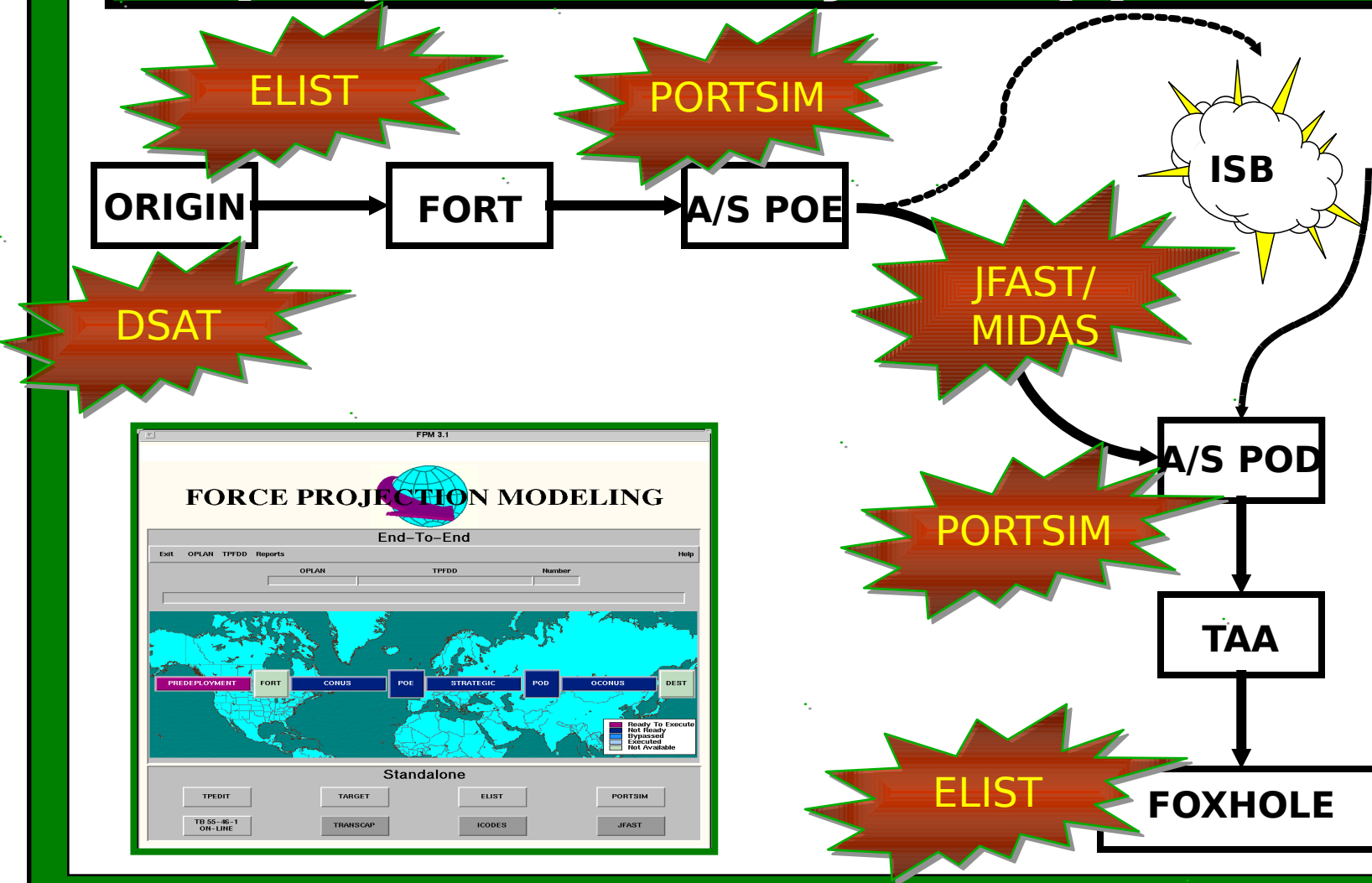
Force Structure and Deployment Plans

- Evaluate Deployability of Force
 - Constraints
 - Equipment Fit
 - Available Assets
 - Infrastructure Limitations
- Use Sophisticated Modeling
 - LIN Detail
 - CINC Support
 - Wargames





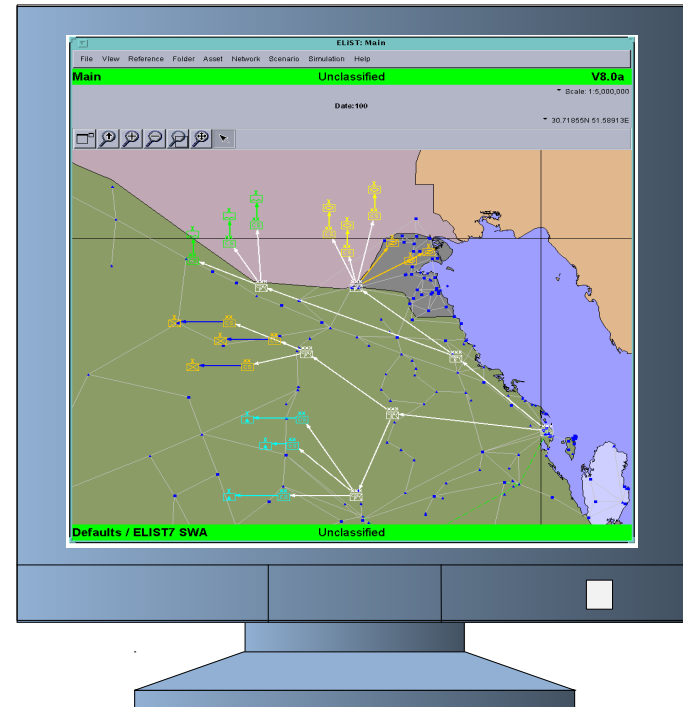
Deployment Analysis Applications





Enhanced Logistics Intra-theater

- Simulates theater transportation/RSO&I
- CONUS/OCONUS theater deployment planning and analysis
- Deploys movement requirements over a transportation network
- Analyzes at item level detail
- Determines force closure, theater movement constraints



Force tracking/unit viewer
More detailed nodal, item
and RSOI analysis capability
Detailed TPFDD editing



Advanced Mobility Concepts Study

- Strategic Mobility Division tasked TEA to:



- Lead Data Working Group and provide analytical support to TRANSCOM



high pay-
that sup
ation
?

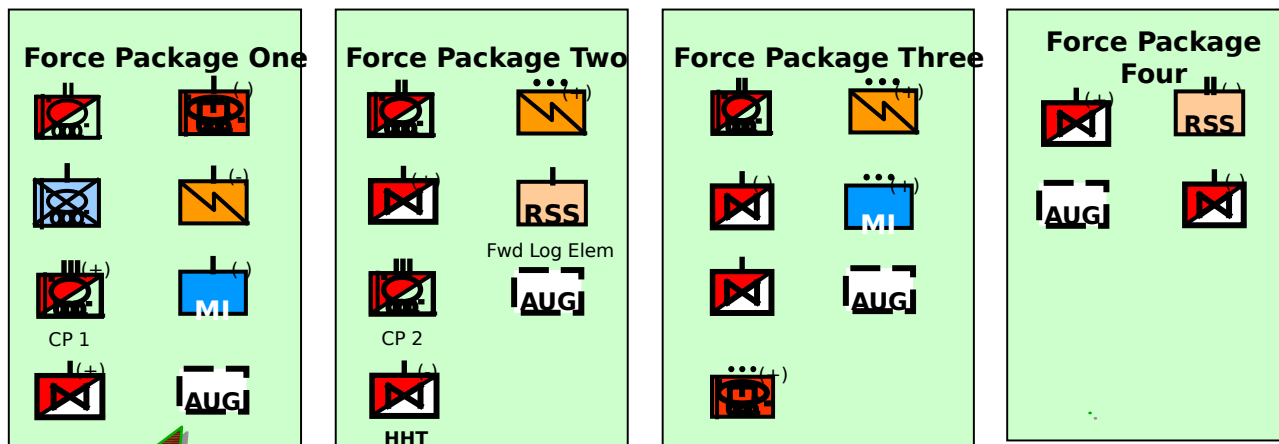




Deployability Analysis Support

2nd Cavalry Regiment

- Over 34 deployment analyses of Force Package/ Scenario Combinations (supporting CSA brief).



OCONUS
Ground and Sea

Working directly with 1TMCA
and Air Mobility Command!

CONUS
Air and Sea



Analysis Support

Deliberate Planning

- 1003/5028 - 1025
- 5027/1015 - 4122

Programmatic Studies

- AMCS
- QDR
- TAA

Crisis Action Support

- Allied Force (EUCOM)
- Desert Thunder (CENTCOM)
- Operation Enduring Freedom (CENTCOM)
- Operation Iraqi Freedom (CENTCOM)

Wargames

- OSDP2 Net Assessment
- Dynamic Commitment Series (QDR)
- Army Transformation Wargames
- Global Engagement VI

Exercise Support

- Millenium Challenge 00 (JFCOM Experiment)
- Unified Spirit 00 (NATO)
- IL 01 (CENTCOM)
- RSO&I/UFL 01 (PACOM)
- Balikatan 01 (PACOM)
- Turbo Challenge 01

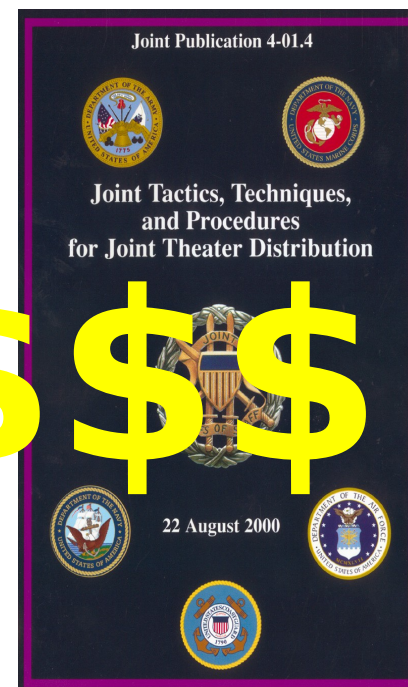
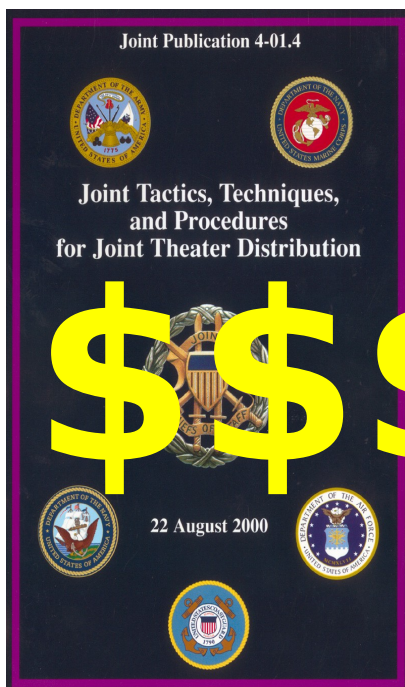


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Why Policy, Programmatics, and Doctrine?

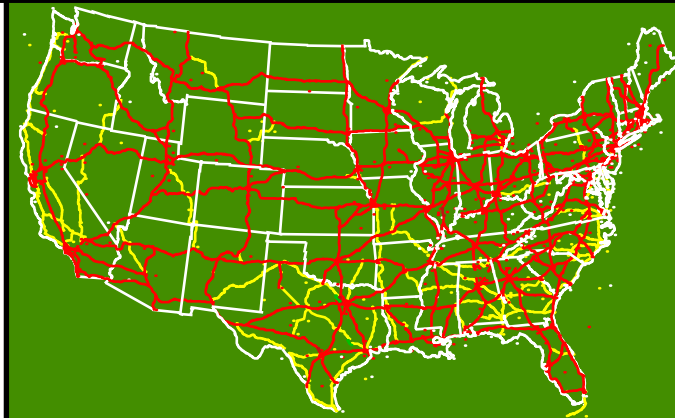




Policy

- Highways for National Defense
- Railroads for National Defense
- Ports for National Defense
- Defense use of Intermodal Systems

Advocate for DOD use of public and commercial infrastructure!

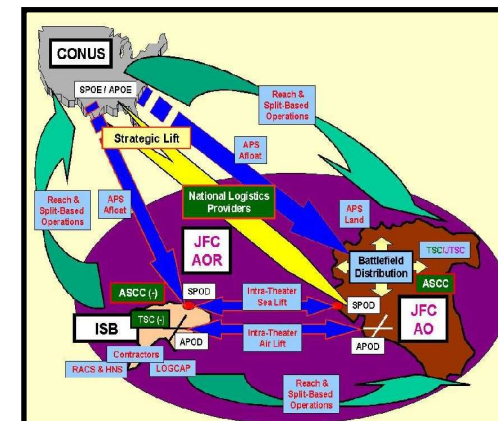
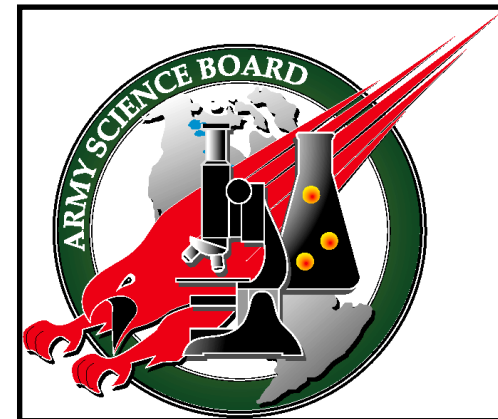


Assisting Fort Lewis on movement of Strykers by Highway



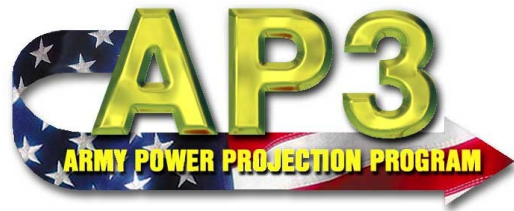
Programmatics and Doctrine

- Army Science Board
- Intermediate Staging Base
- IBCT Organizations and Operations
- Advanced Mobility Concepts Study
- Quadrennial Defense Review

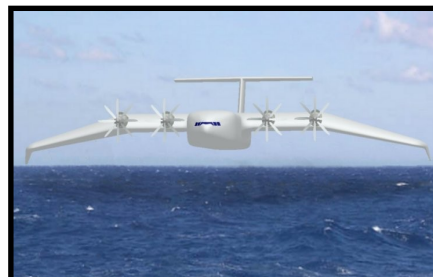
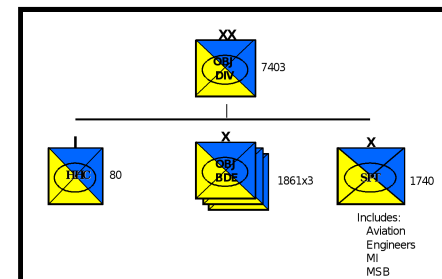




AP3 Baseline Deployment Study



- Infrastructure
- Future Lift Assets
- Future Force Structure



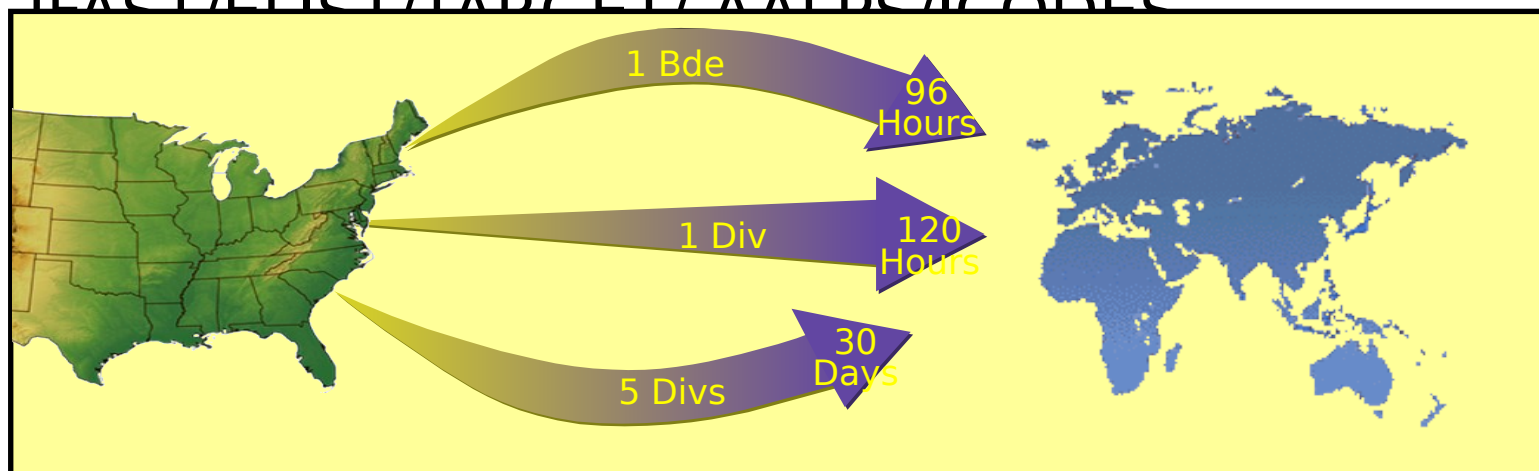
ASMP
Follow-on



AP3 Baseline Deployment Study

- End-to-end look at 96/120/30 deployment goals
- Establish baseline for future studies
- Maintain joint perspective
- Deployment modeling using

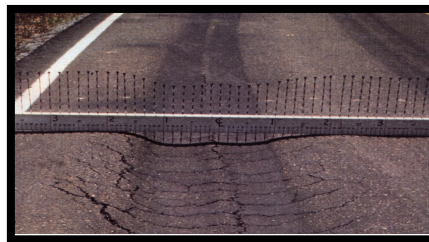
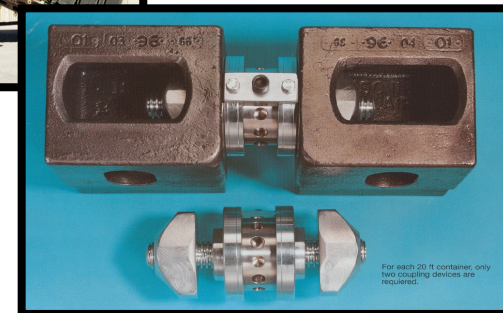
JEAST/ELIST/TARGET/AAALPS/ICODES





Where the Money May Go

- Explore and Exploit Commercial Technologies
 - Intermodalism
 - Aircraft
 - Watercraft
 - Alternative Fuels
 - Battery Technology
 - Lightweight Materials
 - Soil Stabilization and Pavement Technology

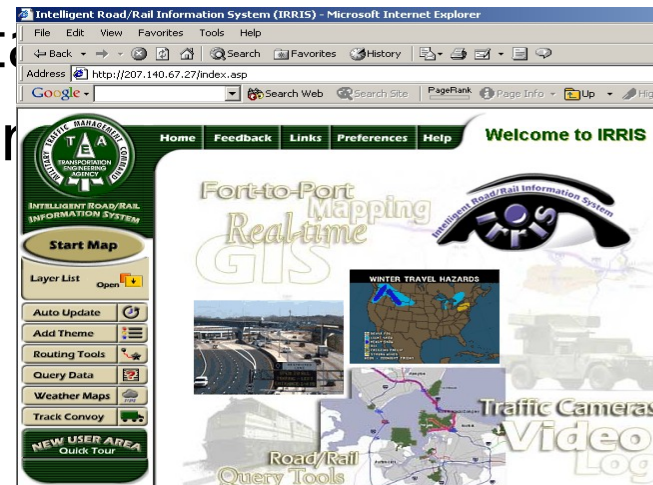




IRRIS

Intelligent Road/Rail Information System

- Port and Installation Data
- Real-time data to support deployments
 - Weather
 - Traffic Congestion
 - Road Closures
 - Construction/Detours



- Routing Tools
- Tracking Capability
- Data Querying
- Robotic Help



Deployability Engineering: Improving the Process

- Equipment Transportability
- DTS Assets
- Infrastructure...the DTS
- Force Structure and Deployment Plans
- Policy, Programmatics, and Doctrine
- Operations and Exercises



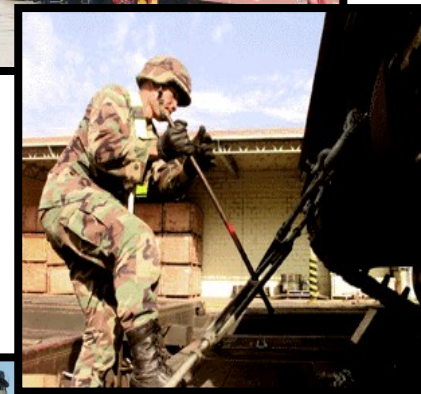
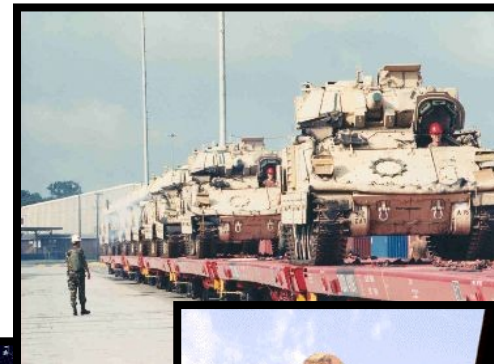
Why Operations and Exercises?





Operations, Exercises, & Guidance

- Providing Expertise in the Field
- Lessons Learned
- Deployment Guidance





Support to I Corps

- At Fort Lewis in Nov 01 to assist in measuring equipment for AALPS
- Identified that there were overloaded items and items not meeting C-130 transportability requirements or O&O reduction reqts
- Met and discussed with Brigade Coordination Cell
- Findings:
 - Many HMMWV/shelter/trailer combos exceed vehicle GVWR and design axle limitations
 - Many systems require extensive reduction for C-130 transport



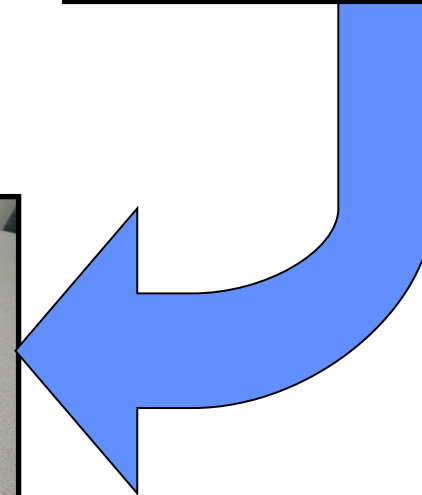
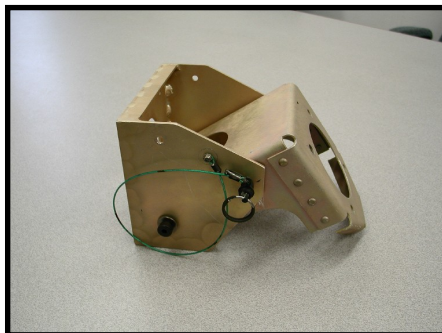
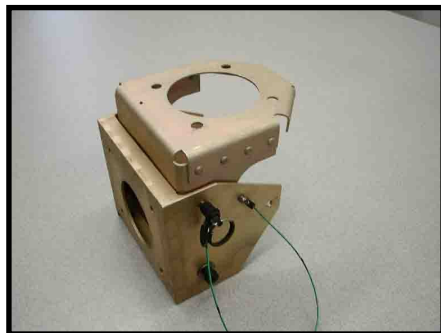


3rd Brigade CERTEX

Meeting with BCC

- Resulted in CERTEX, looking at each piece of equipment
- Precipitated Non-Stryker Transportability Council of Colonels being formed

Working with TRADOC and
TACOM to resolve issues!





Millennium Challenge 02

Air Deployment of IAV

- Air Force Interim Certification



Air Deployment of other IBCT Equipment

- Identified non-certified equipment

Use of Joint Venture

- Developing Stow Plans



On the Ground Support

- Collecting Data with ATEC
- Evaluated Bicycle Lake C-130/C-17 capabilities and limitations

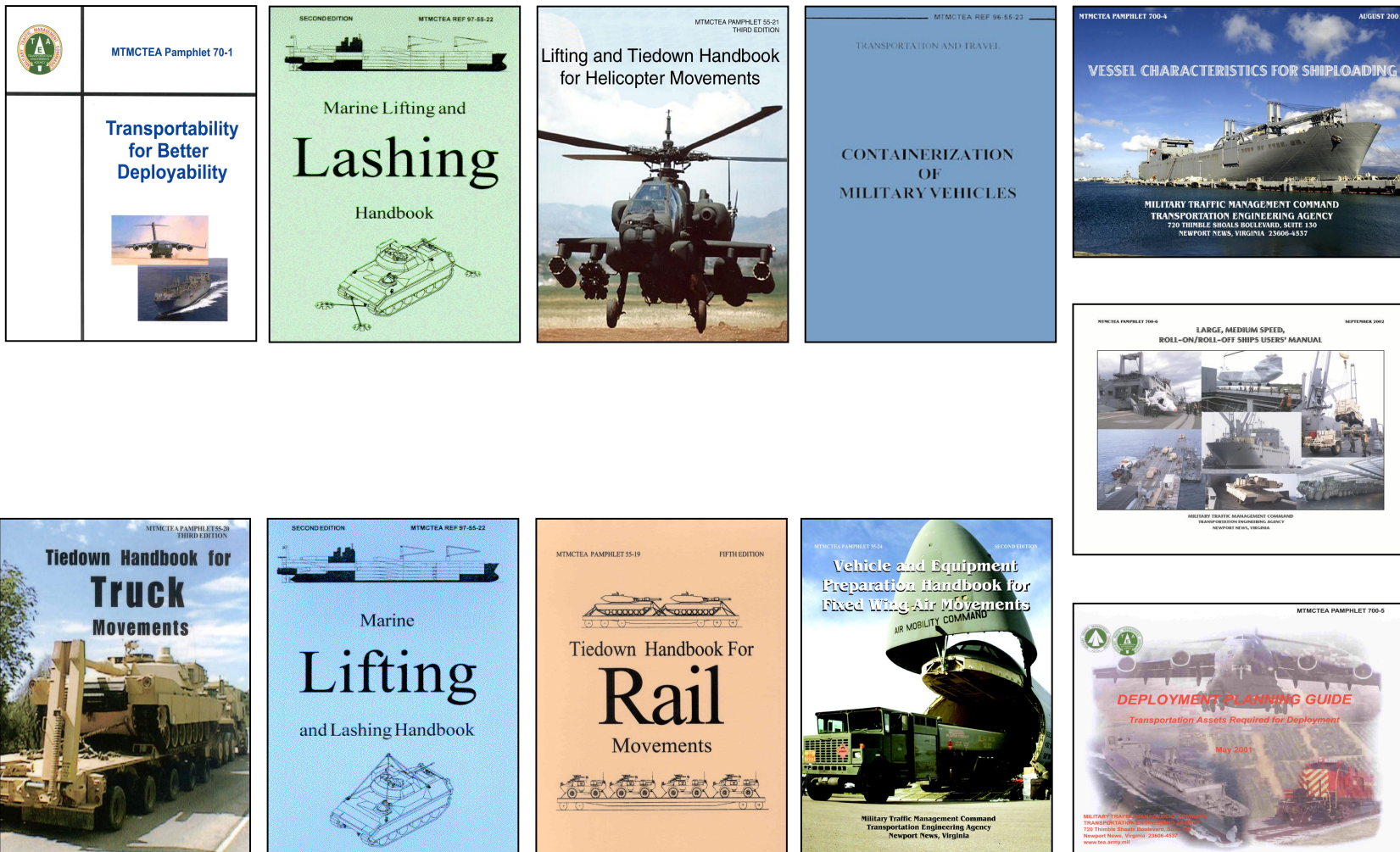




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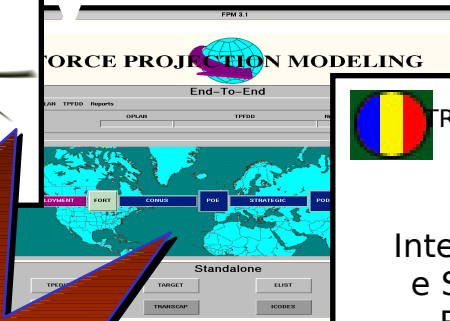
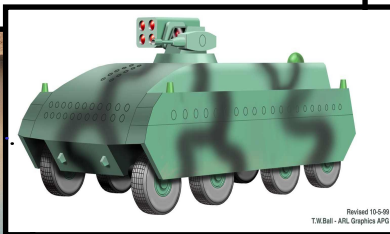
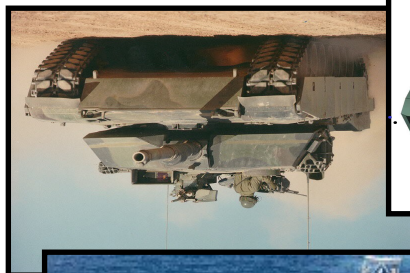


Publications



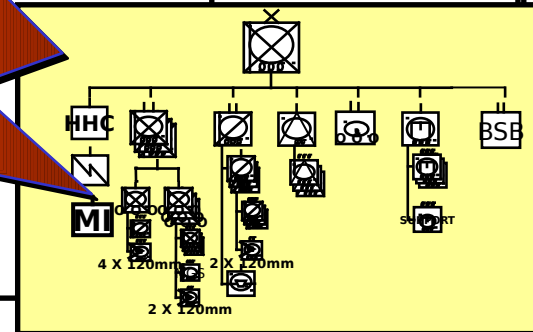
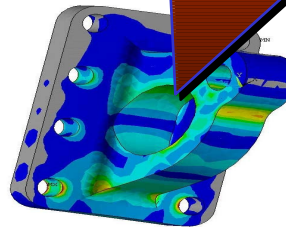


Deployability: TEA's Core Competency



TRADOC
PAM 525-XXX

Intermediate
Staging
Bases





MILITARY TRAFFIC MANAGEMENT COMMAND TRANSPORTATION ENGINEERING AGENCY



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